

Claims.

1. A coherent laser radar (lidar) device having a transmitter portion that comprises a single wavelength laser source, a conversion means for producing a combined light beam that comprises at least two component light beams of discrete wavelength from the output of said single wavelength laser source, and transmit optics to direct the combined light beam to a remote target, wherein each component light beam of the combined light beam traverses the same optical path from the single wavelength laser source to the transmit optics.
2. A device according to claim 1 wherein a receiver portion is additionally provided that comprises receive optics to collect light returned from the remote target and a coherent detection means.
3. A device according to claim 2 wherein each component light beam collected by the receive optics traverses the same optical path from the receive optics to the coherent detection means.
4. A device according to any one of the preceding claims wherein the conversion means comprises an electro-optic modulator (EOM).
5. A device according to claim 4 wherein the EOM is electrically driven to provide at least three component light beams of discrete wavelength.
6. A device according to any one of claims 4 to 5 wherein the EOM is electrically driven to provide at least five component light beams of discrete wavelength.
7. A device according to any one of claims 4 to 6 wherein the transmitter portion additionally comprises a polarisation control means.

8. A device according to any one of the preceding claim wherein the transmit portion further comprises at least one optical amplifier.
9. A device according to any preceding claim wherein a frequency shifting means is provided to introduce a frequency shift between the laser beam received by the conversion means and its associated local oscillator signal.
10. A device according to any one of the preceding claims wherein at least some of the optical components of the device are interconnected via optical fibre cable.
11. A device according to claim 10 wherein the local oscillator beam is coupled from the transmitter portion to a receiver portion via an optical fibre delay line.
12. A device according to any one of the preceding claims wherein separate transmit optics and receive optics are provided.
13. A device according to any one of the preceding claims wherein the wavelength of one of the at least two component light beams is selected to coincide with a peak in absorption of a gas species of interest.
14. A device according to claim 13 and further comprising means to vary the wavelength of one or more of the at least two component light beams in response to the detected return signal falling below a threshold level.
15. A lidar device comprising a single laser source and arranged to transmit a beam that comprises three or more wavelength components to a remote target.
16. A device according to claim 15 that comprises an electro-optic modulator.